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STUDY OF NON PERFORMING ASSETS IN INDIAN BANKS – A BRIEF LITERATURE REVIEW

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Abstract: *Non-Performing Assets (NPA), found all over the world are a drag on banks and adversely affect economic development. On one hand, NPA can possibly be stated to be relating to lending gone bad, on the other hand it can possibly be related to various processes and systems which were unable to reject unfavourable projects / borrowers at the right time, leading to their buildup. Regulators insist on making the banks safe by regulating them for providing adequate capital to absorb such lending failures.*

Purpose: *This paper aims to focus on literature relating to study of non-performing assets with a general focus on the Indian economic system.*

Design/Methodology/Approach: *Focuses on presenting summarised/key findings from authors across the world and in India and suggesting new potential pathways for conducting research in the area.*

Findings: *non-performing assets are a big problem in all banks and need to be handled so as to preserve the financial health of the bank and the entire financial system.*

Original Value: *brings together diverse knowledge into a coherent whole.*

Keywords: *Non-Performing Assets,*

Paper Type : *Conceptual Paper*

1. INTRODUCTION

1.1. Meaning of Non Performing Asset

Non Performing Assets (NPA) also known as Problem Loans, Defaulting Loans, Bad Loans and Non Performing Loans (NPL) in the literature, have been studied in the financial sector across the world for a long time as they impact on bank profitability and ultimately on bank survival / existence. However, a structured approach to the study of NPAs in India appears to be underway to a large extent during the last 25 years or so. NPA originate from the pool of assets / lending done by the bank due to non-payment of dues by borrowers to the bank as per the agreed repayment schedule.

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NPA may be considered as contamination of the loan portfolio, which needs to be arrested in order to maintain the financial health of the system / economy. NPA demonstrate elements of toxicity which, if not addressed, may lead to severe disorders in the economic system.

Following a series of bank liquidations in 70s and 80s, Bank of International Settlement (BIS) took steps in trying to establish and prescribe norms for bank regulators for facilitating smooth international transactions to support cross border and other cash flows through banks in their jurisdictions. Prescriptions known as Basel I, Basel II and Basel III have been issued – BIS (2013) with a view to adopt the new rules on varying timescales.

Reserve Bank of India (RBI), India's central bank and regulator, takes steps to implement Basel Norms. Banking sector comprises – Scheduled Commercial Banks (SCBs) comprising Public Sector Banks and Private Sector Banks and other institutions. State Bank of India and its Associates (SBIA) and Nationalised Banks (NB) are collectively called as Public Sector Banks (PSB). Private Sector Banks (PrSB), included in the category of Other SCB comprise of Old Private Sector Banks (OPSB) and New Private Sector Banks (NPSB). RBI prescribes the environment for bank functioning.

This review of literature considers papers relating to concept and evolution of NPA, estimating some of its causes and effects largely using data post default. Some researchers suggested better control for sanction of financial assistance by the bank and suggested models.

1.2. Analytical Definition of NPA and other parameters of relevance to this study

NPA was defined for the first time in India in early 90s in the RBI Master Circular on Income Recognition and Asset Classification and it has been modified from time to time. An NPA account is one which has been in default for more than 90 days. NPA are to be classified into Sub-Standard Assets, Doubtful Assets and Loss Assets based on objective criteria for better comparability amongst the banks. Accounts not in default shall be classified as Standard Assets. Bank management and statutory auditors should ensure adequate provisioning for NPA on the basis of asset classification. Loss assets may be retained in bank books only if they are fully provided for. Banks may voluntarily make specific provisions at higher rates after obtaining approval of the Board of Directors and are consistent from year to year.

1.3. Current position of NPA in India

"India's banking system has amassed substantial non-performing loans in the aftermath of an economic slowdown that, coupled with delays in securing statutory approvals and completing land acquisition, stalled many projects, squeezed corporate cash flows and made it difficult for borrowers to repay loans. There are four stages of dealing with stressed assets— identification, recording, reporting of this particular subject has been turned satisfactorily, but resolution, which is the fourth leg, needs to be worked (on) more" as commented by Mr Urjit Patel, Governor RBI after the first Monetary Policy Committee Meeting.

This review paper looks at the global and Indian position for different dimensions of analysis of NPA viz trends in NPA, evolution, analysis and measurement, ascertaining causes and effects of NPA, issues surrounding economics of information and corporate governance relating to banks / lending. The paper also reviews papers on the suitability of modern (next generation) research methodologies for research in the area. Finally, it lists out some areas of research which a researcher may pursue. A broad distribution of about 165 papers reviewed, along different dimensions of study pursued by authors is as under.

Table 1
Distribution of Papers and No. of Papers Reviewed

Topic / Area of Research	*Overseas*	*%*	*Indian*	*%*	*Total*	*%*
Trends	1	1.2%	20	23.8%	21	12.7%
Management of NPA	2	2.5%	20	23.8%	22	13.3%
Causes of NPA	18	22.2%	8	9.5%	26	15.8%
Effects of NPA	4	4.9%	5	6.0%	9	5.5%
NPA Measurement	1	1.2%	5	6.0%	6	3.6%
Stock Market Related	0	0.0%	16	19.1%	16	9.7%
Economics of Information – Adverse Selection	8	9.9%	0	0.0%	8	4.9%
Economics of Information – Moral Hazard	11	13.6%	3	3.6%	14	8.5%
Corporate Governance	16	19.8%	6	7.1%	22	13.3%
Use of SEM Methodology	2	2.5%	1	1.2%	3	1.8%
Use of PLS PM Methodology	18	22.2%	0	0.0%	18	10.9%
GRAND TOTAL	**81**	100%	**84**	100%	**165**	100%

Source: Authors analysis of papers / areas of study

2. TRENDS IN NPA

The landscape of NPA analysis may be schematically presented as per Figure 1. This shows 4 clear zones relating to borrowal accounts. A lot of NPA studies reviewed related to Zone D which represents a situation post default by borrower.

Since NPA arise out of bank operations, almost all banks in the world face this problem. This section lists the trends in NPA both globally and in India, including efforts made by researchers while studying the problem.

2.1. Global Trends

Sanjeev (2007) stated NPA to be a major problem observed in banks around the world. As per the official figures of IMF (2016), the NPL / TL is 1.47% for US, 1.04% for UK, 7.39% for India, 18.06 % for Italy and 8.35% for Russian Federation.

2.2. Historical Evolution of Indian Banks and NPA

In order to get a glimpse of the landscape of NPA with respect to Indian banks, it is important to view the historical evolution of Indian banks and the NPA problem. Poongavanam (2011), Verma & Adki (2011), Goyal & Kaur (2011), Prasad & Veena (2011) and Pandey & Kaur (2012) presented a detailed description of changes in the landscape of Indian banking. They covered phases from nationalisation, to liberalisation, reforms in Indian banking industry and adoption of Basel norms reflected in RBI guidelines relating to income

The Landscape for NPA Analysis : A representative borrowal account with potential default

Zones >>	A	B	C	D
	Pre Sanction	**Pre Disb-ursement**	**Post Disbursement**	**Post Default**
Information Availability				
	Not Much	Not Much	Rich Info available in AR and on the web	Rich Info available in AR and on the web
Data Available in Public Domain				
	Not Much	Not Much	Information about Business Environment, Aggregate Disbursements, NPA, Provisions, CRAR, ALM, Various Financial Ratios, Book Value, Share prices, Corporate Governance Disclosures, Willful Defaults, etc	
Concerns for NPA Studies				
	Minimise Adverse Selection	Minimise Adverse Selection	Need to improve monitoring to minimise NPA formation	High NPA visible in the system, needs to be minimised
Tools Availabe for Minimising NPA				
	Screening of Borrowers	Screening of Borrowers	Credit Monitoring, Periodic Asset Quality Reviews	Restructuring, OTS / Recovery / SARFAESI
NPA Study Variables examined by various authors				
			Advances, Gross NPA, Provisions, Willful Defaulters, Bank Market Capitalisation, PAT, BV, Equity Market Capitalisation, Corporate Governance Disclosures - Role and effectiveness of board meetings and other meetings of directors, investments, other assets	

Figure 1 : NPA Landscape

Source : Authors representation of the NPA landscape based on analysis of papers / areas of study

recognition and asset classification and others as also the history of recapitalisation of banks in the period. They went on to highlight changes in the recovery mechanisms.

2.3. Indian Trends

Rajesham & Rajender (2007), Goyal & Kaur (2011), Verma & Adki (2011), Bansal (2012), Koundal (2012), Kumar & Singh (2012), Rangan (2012), Mohnani & Deshmukh (2013), Pradhan (2013) and Sikdar & Makkad (2013) studied bank NPAs for different periods in the overall time range of 2002 to 2012. The banks were studied in groups of PSU Banks and Private Sector Banks together with their sub-groups as also Foreign Banks. They studied number of bank branches, number of employees, business per employee, credits and deposits of banks, GNPA/GA, NNPA/NA, asset classification, Capital Adequacy Ratio, sectoral deployment of funds and resultant NPAs, recovery efforts of banks, efficiency of operations, relationship between interest rates and accumulation of NPA and ROA of banks. The employed a range of statistical techniques largely revolving around regression analysis and other comparison related techniques. They brought out key issues associated with NPAs and suggested important implications arising out of their research. Authors believe that the disclosures and facts forwarded within the papers will enable banks to be proactive towards risk assessment and well-informed in their fund-based dealings with the commercial banks.

2.4. Components of NPAs – Study of different sub-categories of NPA

Malyadri & Sirisha (2011), Patidar & Kataria (2012), Siraj & Pillai (2012), Srivastava & Bansal (2012) and Nagarajan et al (2013) studied SCBs and covered weaker sections, priority sector advances, agriculture, SSI and others, as also other types of borrowers. They also studied movement of movement of GNPA, NNPA, Additions to NPA, Reductions to NPA, Provisions towards NPAs and compared it with Total Advances and Total Deposits of Banks. Various equations were estimated using OLS techniques and authors have reported existence of a significant relation between chosen variables studied in the papers.

3. NPA ANALYSIS AND MEASUREMENT - GLOBAL

Researchers across the world have attempted to measure and forecast NPA metrics in banks and this section elaborates on the work of some of the authors in the area, divided on the basis of geography and causes and effects of NPA.

3.1. Causes of NPL

3.1.1. Country Specific Findings

Nobuo et al (2005) {Japan}, Khemraj & Pasha (2009) {Guyana}, Louzis et al (2010) {Greece}, Guy & Lowe (2011) {Barbados}, Joseph et al (2012) {Zimbabwe}, Muhammad et al (2012) {Pakistan}, Park & Zhang (2012), Saba et al (2012) {USA}, Dickson & Marobhe (2013) {Tanzania}, Murumba (2013) {Nigeria}, Shingjergji (2013) {Albania} and Warue (2013) {Kenya} examined one or more direct bank specific variables and one or more macro economic variable as independent variables and estimated their impact on NPLs using data from about 1985 – 2012. Bank specific variables included bank interest rates, liquidity ratios, adjusted CAR, unemployment rates, loan – deposit ratio, loan growth, ROA, ROE, CAR, bank balance sheet composition and NIM while macroeconomic variables included REER, GDP growth, GDP per capita, inflation rate, energy crisis, exchange rate and Federal funds rate. They found significant linkages between their chosen variables and NPLs. Some authors also conducted stress testing of the developed models. Authors used multiple regression and dynamic panel data methods to support their findings. Names of countries enclosed in { } refer to the countries of subjects of study.

3.1.2. Groups of Countries / Blocs

Fofack (2005) {Sub-Saharan Africa}, Boudriga et al (2009) {59 countries}, Espinoza and Prasad (2010) {GCC region}, Beck et al (2013) {85 banks in Italy, Greece and Spain} and Dubey & Binil Kumar (2014) {BRICS nations} examined one or more direct bank specific variables and one or more macroeconomic variable as independent variables and estimated their impact on NPLs using data from about 1995 – 2012. Bank specific variables included bank interest rates, RoA, NIM regulatory capital to RWA, CAR, loans loss provisions and Lending IR while macroeconomic variables included Real GDP growth rate, GDP Per capita, M2, change in REER, real interest rate, interbank loans, equity to total assets, equity to liquid assets, level of country financial development, GDP growth rate, Foreign ownership of banks, bank market concentration, percentage of state owned banks, non-oil real GDP growth, stock market returns, interest rates, world trade growth, the VIX index (proxying for global risk aversion and tight financing conditions, credit risk issues, feedback system (subsequently tested using a VAR model), RGDP, NEER, Share Prices, exchange rate, unemployment rate, Industry value added to GDP, Gross Capital Formation and ICL. They found significant linkages between their chosen variables and NPLs. Some authors also conducted stress testing of the developed models. Authors used multiple regression and bank-wise dynamic panel data methods to support their findings. Names of countries enclosed in { } refer to the countries of subjects of study.

3.2. Effects of NPL

3.2.1. Country Specific Findings

Glenn & Pain (2002) {UK banks}, Detragiache & Gupta (2004) {Malaysia} and Funso et al (2012) {Nigeria}, examined one or more direct bank specific variables and one or more macroeconomic variable as independent variables and estimated their impact on NPLs using data from about 1978– 2011. Bank specific variables included effect of provisioning of banks on earnings and capital, higher interest rates and other predictors, profitability, interest margin, equity, overhead/assets, NPL, loan growth, deposit growth while macroeconomic variables included UK GDP and World GDP. They found significant linkages between their chosen variables and NPLs. Authors used multiple regression and other analytical methods to support their findings. Names of countries enclosed in { } refer to the countries of subjects of study.

3.2.2. Groups of Countries / Blocs

Georgiou (2011) studied Western European and American banks using data from World Bank (for IV - NPL) and OECD (for DV – TL/TA) for 2000 – 08 The unbalanced sample had 110 observations. An average figure of NPLs was estimated and the resulting credit expansion policy was estimated as a whole.

3.3. Characteristics of NPL management techniques in different countries

Reddy (2003) compared NPA in India versus other countries, to find similarities and dissimilarities and remedial measures initiated by economies like China, Thailand, Korea and Japan and compared them to the Indian situation. Author has concluded that the importance of a sound understanding of the macroeconomic variables and systemic issues pertaining to banks and the economy are important together with the existence of a strong legal framework in order to present a transparent and fair solution.

Saurina (2010) looked at Spanish banks and found that they use dynamic provisions method, which enables earlier detection and coverage of credit losses in banks' loan portfolios which build-up of a buffer in lending booms and can be used in recessions. It enhances the resilience of the bank and the system.

4. NPA MANAGEMENT - INDIA

Muniappan (2002), He (2002), Sanjeev (2007), Karunakar et al (2008), Goyal (2010), Rajeev & Mahesh (2010), Chaudhury & Sharma (2011), Kaur & Singh (2011), Poongavanam (2011), Prasad & Veena (2011), Balasubramaniam (2012), Chatterjee et al (2012), Jain & Sheikh (2012), Malyadri & Sirisha (2012), Pandey & Kaur (2012), Rao et al (2012), Satpathy & Patnaik (2012), Shyamala (2012), Sakaria (2013), Srinivas (2013), Patel (2016) and Vishwanathan (2016) studied various dimensions of NPA management in India outlining and classifying the reasons for accumulation of NPA, their relative importance and possible techniques of tackling NPAs viz supervisory action and recovery efforts including legal recourse and other methods eg recourse to Asset Reconstruction Companies for facilitating resolution of NPA. Authors also reported the importance of monitoring and controlling as also appraisal as poor credit scoring skills were observed and there was evidence of external intervention in bank processes. Authors noted that seizure and disposal of collateral were tough challenges. It was found that banking system was enthusiastic to increase lending which raised concerns about adverse selection and increase in stock of NPA. Authors studied trends in NPA, asset quality and variables such as GNPA, GNPA to Gross Advances and to Total Advances, NNPA, NNPA to Net Advances, Asset Quality, sector-wise NPA. Authors also recommended formation of self-help group model to tackle NPA. NPA levels were found to be higher than international levels but manageable. Authors recommended both preventive and curative strategies for NPA management as the onus for containing factors leading to NPA rests with banks. Lending policies were reported to be improper. Authors also found that quick identification of NPA was an essential component and banks should try to check misutilization of funds, improper follow-up and ensure appropriate financing. For this, banks may look at structural changes in the organization. Authors recommended settlement acceptance with a haircut, if required. NPA resolution techniques of different countries were also examined. Authors found that asset quality of banks had improved due to improved risk management practices, greater recovery efforts, SARFAESI Act 2002 and CDR mechanism.

Authors have suggested that banks should take care to ensure that they give loans to creditworthy customers as prevention is better than cure. They have concluded that a systematic framework with a clear objective, flexibility and adequate financial support is required to resolve the distressed situation and for the strategy to succeed, adequate legal provisions and supporting regulatory, environment are the prerequisites. Governor of RBI recently stated that there are four stages of dealing with stressed assets—identification, recording, reporting and resolution. Of these, the first three have been satisfactory in recent times, however, resolution, which is the fourth leg, needs to be worked (on) more. India's banking system has amassed a massive pile of non-performing loans in the aftermath of an economic slowdown that, coupled with delays in securing statutory approvals and completing land acquisition, thereby stalling many projects, squeezing corporate cash flows and making it difficult for borrowers to repay loans.

5. MEASUREMENT OF NPA AND ITS RELATIONSHIPS – INDIA

5.1. Modeling for Gross NPA to Gross Advances

RBI in its Reports on Trends and Progress in Banking for different years presented information relating to incremental NPA to incremental advances during the year. In its report of 2004, RBI has reported that various studies have shown that NPAs have two components; the overhang component and the incremental component (Jalan, 2002, Munniappan, 2002). The overhang component arises due to infirmities in structural and institutional environment while the incremental component arises from factors internal to banks' management and credit culture. This is in a way a view on accretion to NPA out of fresh advances. This is perhaps a close indication of the phenomenon of adverse selection.

MacDonald & Koch (2006), Siraj & Pillai (2012), Rawlin et al (2012), Talwar & Kulhari (2012) and Bandyopadhyay (2013) studied several variables relating to NPA at a portfolio level, because portfolio level data have utility despite the fact that various risks are difficult to measure from published historical data. They developed models for estimating NPA and that the obtained models could be useful and NPA may be forecast at a very early date. Authors also recommended that effective CRM process for Indian banks including using good tools for identification, analysis and measurement of credit risk, use of risk adjusted interest rates, adoption of a credit standard, adequate top management oversight and adoption of best practices is very important. They have also estimated that NPAs are affected by credit growth with time period lags of upto 3 years. NPA forecasting was done for 6 banks using spline model which clearly demonstrated future upward trend that questions the wisdom and integrity of the top management in handling credit portfolio. Author recommended that the situation deserves immediate and serious attention of regulators to revisit practices of credit appraisal and monitoring of credit in PSB in India.

6. CAUSES OF NPA – INDIA

6.1. Forecasting NPA – using bank specific explanatory variables only

Gupta & Jain (2010) and Siraj & Pillai (2013) studied about 10 year data and estimated the relationship between key variables of banks and its impact on NPA. Separate equations were obtained for different bank groups.

6.2. Forecasting NPA – using macroeconomic and bank specific explanatory variables

Ranjan & Dhal (2003), Das & Ghosh (2007), Misra & Dhal (2010), Swamy (2012) and Siraj & Pillai (2013) studied the period 1998 – 2012 and looked at several variables to obtain estimates of NPA. The variables studied were GDP, banks loan maturity, interest rate, collateral value, bank size, credit orientation viz CDR, loan exposure to priority sector. The results of the study are consistent with view in the banking literature and provide an important insight for banks' lending behavior. The specific variables used were Policy

Rate, Regulatory Capital Requirement, Business Cycle, loan interest, cost burden of banks, collateral, loan maturity, credit orientation, growth rate of real GDP, Per Capital Income at NNP, Market Capitalisation Growth Rate, Index of Industrial Production, Inflation Rate, Savings Growth Rate, Bank Lending Rates, Bank Assets, CAR, CDR, Cost of Funds, ROA, Number of Rural and Sub-Urban branches / Total Bank branches, Bank Credit Growth Rate, PSL / Total Loans, OPEXTA. Authors state that findings reveal that at the macro level, GDP growth and at the bank level, real loan growth, operating expenses and bank size play an important role in influencing problem loans. Certain robustness tests of the results were also conducted which led to formulation of several policy implications of the analysis. The analysis used multiple regression and panel data regression model. The findings of the study reveal that the interaction effect is highly significant in explaining the relationship between GA and NPA. The significance of interaction on credit risk may be utilized by regulatory authorities for effective management of NPA in SCB.

7. EFFECTS OF NPL – INDIA

7.1. Measuring effects of NPL

Samantaraya (2007), Yadav (2011), Jani & Raval (2012), Rajput et al (2012) and Kaur & Kaur (2013) studied long time data series to study behavior of aggregate bank credit on the basis of GDP Growth Rate, Inflation, CRR, CRAR and NPA. The impact of NPA on profitability and other variables including efficiency and productivity at aggregate and sectoral level was estimated using several linear regression equations wherein RoA has been estimated using OLS techniques using various variables as IVs i.e. NPA, spread burden, priority sector advance, CD ratio, operating expenses, term deposit, provision and contingencies. They also studied various ratios related to NPAs and profitability and found the impact of the NPAs on profitability in order to suggest the way to increase profitability through adopting better strategy to curb NPAs. The performance of banks in terms of credit efficiency and impact on the profitability was estimated using panel data regression analysis. Impact on profitability (RoA) was estimated using NPA, CAR, Spread, Business per Employee and Operating Expenses. The study concluded that NPAs affect adversely the profitability of banks while risk aversion seems to be in favour of PSB.

7.2. Stock market interactions with Indian bank company stocks

Kothari & Sharma (2009), Chakraborty (2010), Jeyanthi & William (2010), Shaikh (2010), Idier et al. (2011), Jain et al (2011), Sahoo & Mishra (2012), Makkar & Singh (2013), Bihari & Charde (2014), Ghosh et al (2014), Joseph & Prakash (2014), Murari (2014), Narayan et al (2014), Singh & Makkar (2014), Suresh & Paul (2014), Babu (2015), Rajamohan & Durairaj (2015) and Dubey & Kumari (2015), examined the NPA position of banks, and bank stock volatility and equity share market returns of bank stocks using data generally covering the period 1994 – 2010. Some authors also assessed sensitivity to market risk of important variables as also estimating the correlation between the financial performance of the banks and its stakeholders relationship with the investment. Select authors studied stocks of particular banks while others looked at groups of banks or index of stocks eg S&P CNX Nifty, Sensex, Bankex etc. A few authors attempted to forecast future share price based on expected growth rate. Authors used bank specific variables viz NPA, advances, provision for NPA as also macroeconomic variables viz per capita income, consumption patterns in the economy, GDP growth rate, using secondary data. Authors tried to estimate relationship amongst the variables, both before and after the crisis. Impact of NPA on bank stock returns was also estimated.

8. ECONOMICS OF INFORMATION

When different stakeholders for a project are involved in a principal-agent relationship, the outcomes could be quite different from rational or normal outcomes. Notwithstanding principles of corporate finance, the reasoning and actions of the agents may not be optimal for both parties at the same time. Usually, the principal suffers on account of the acts of the agent who basically acts in his own interest and tries to distort the rules of the game. In the field of economics of information, key issues discussed by the researchers revolve around following micro variables : find out reasons why banks are unable to lend to corporate sector, NPA in banks, how banks may solve the adverse selection problem, credit rationing, use of collateral, application of moral hazard to financial contracts and other macrovariables trace the history of problems of information economics, understand how adverse selection and moral hazard happened and how it can be minimised, study financial intermediation – specifically relating to timing and outcomes of investment, risk characteristics of assets, risk management – stability of financial system.

8.1. Economics of Information – Adverse Selection

Williamson (1986), Jappelli & Pagano (2000), Claus & Grimes (2003), Mishkin (2003), Duffie & Singleton (2007), Mehrteab (2005), Tirole (2006), Duffie & Singleton (2007) and Dionne (2012) studied adverse selection in the credit markets and its uniqueness and other attributes. It was generally found that information is asymmetric, very important but costly to acquire. These problems pose several challenges that are not present (at least to the same degree) with many other forms of market risks. Looking to the manner in which the industry operates, borrower will have an incentive to falsely default on the loan which may be monitored but at a high cost. This impacts efficient allocation of credit but lenders can screen and monitor borrowers for statistical risk management to grant and price loans based on past performance. They report that adverse selection occurs before the transaction commences and increases likelihood of transformation of loans to bad credit risks, while moral hazard happening later, lowers the probability that a loan will be repaid. Financial contracts lead to such problems. In the case of asymmetric information, the lender behavior is different. The economics of risk management for financial firms is far from an exact science. An appropriate appetite for risk is ultimately a matter of judgment based on multiple factors. Senior managers of financial institutions develop policies and systems to identify sources of risk, methodologies of managing those risks. It was observed that though economics of information problems were researched since early 1960s, moral hazard and adverse selection were important issues where empirical verification can be done for these phenomena but complications arise.

8.2. Economics of Information – Moral Hazard

RBI Master Circular (MC) on wilful defaulters puts in place a mechanism to identify and declare such accounts, deny further banking facilities to such defaulters and take legal action against them. It broadly covers deliberate non-payment of the dues despite adequate cash flow and good networth; siphoning off of funds to the detriment of the defaulting unit; misappropriation of funds for asset financing; misrepresentation / falsification of records and other forms of cheating.

Diamond (1984), Williamson (1986), Jappelli & Pagano (2000), Muniappan (2002), Claus & Grimes (2003), Crockett (2003), Mishkin (2003), Mehrteab (2005), Tirole (2006), Thakor et al (2008), Rodrik & Rosenzweig (2010), Dionne (2012), Wikipedia (2014) and Dubey & Binilkumar (2015) studied issues surrounding moral hazard and researched upon its attributes. Authors highlighted the importance of information sharing and co-ordination between banks and financial institutions which can prevent emergence of NPAs even at the implementation stage. As soon as a default is observed, prompt corrective action helps otherwise the problems of that single institution can get compounded and magnified for other institutions too. Inadequacies of legal systems in many countries were also researched particularly with regard to property rights. They stated that banking is fragile and institutions face an important probability of failure and a potentially severe Moral Hazard problem with a large social cost, which may be of a systemic nature. One form of Moral Hazard relates to effort put in by the borrower to achieve project outcomes, while a second form viz voluntary default exists where the borrower has the ability to repay and chooses not to do so. Empirical verification can be undertaking to identify the problem when attempting to correct imperfections and improve resource allocation. However, numerous complications arise when an attempt is made to measure the phenomena. Evidence of moral hazard in 6 large Indian banks was also presented.

9. CORPORATE GOVERNANCE IN BANKS

Dalton et al (1998), Macey and Ohara (2003), Levine (2003), Bhasa (2004), Gopinath (2004), Steen (2004), Mullineux (2006), Ghosh (2006), Handley et al (2007), Onumah et al (2007), Hossain (2008), Jackling & Johl (2009), Pandya (2011), Okpara (2011), Hussain (2012), Panchasara and Bharadia (2013), Ahmed & Hamdan (2015), Dobre & Brad (2015), Pintea & Fulop (2015), Madhani (2015), Sharif & Lai (2015) and Sarkar & Sarkar (2016) studied corporate governance practices in different economies and in different types of companies. A number of articles however, related to banks. On conducting a meta-analysis of several studies dealing with linking corporate governance practices and firm performance found little consistency in results. Using suitable moderators (firm size, the nature of the financial performance indicator and other parameters of board composition) they found little evidence of systematic governance structure/financial performance relationships. Authors pointed out that Board of Directors of banks should be made accountable for the fulfillment of the fiduciary duty to depositors and adequate internal controls should be put in place. This becomes all the more important because of two special features of banks – their opaqueness compared to other firms and the underlying tight regulation on banking operations. Market discipline can help exert governance over banks but greater disclosure is required to increase market discipline. As per extant literature across the world, there are four different models of corporate governance. These are the Model I : US-UK model of market centric control, Model II : the Japan-German model of relationship based internal control, Model III : the model of transition economies (transiting from erstwhile Communist / Socialist regimes to market based regimes) and Model IV : the model of emerging economies (having features of both market based and internal controls – prevalent in Taiwan and India). Author highlights that whereas Models I and II have been studied extensively and are well documented in literature, not much has been written on Model III while Model IV barely finds any mention in literature. Corporate governance is important because managers can act against the interests of shareholders hence greater responsibility rests with the board of directors and the management. Banks thus have a fiduciary duty towards depositors as well as shareholders and entrepreneurs. As Basel II is progressively adopted banks will be induced to enhance their CG codes, internal controls, auditing procedures and bankruptcy laws in order to implement its risk based approach. A key issue with banks arises from the structure of their balance sheets – high leverage and a mismatch in their assets and liabilities, which necessitates a wider duty of care for bank directors.

The SEBI Model Listing Agreement entered into by every listed company and the stock exchanges, contains Clause 49, which stipulates various requirements for governance.

The role of governance mechanisms in determining bank outcomes has been studied mostly in the context of developed economies and focused mainly on private banks. However, recent efforts have been looking at Indian banks, looking at the importance of board size and board composition in determining bank outcomes using data from an emerging economy, India, and using a sample that includes both public and private banks. Relatedly, authors also examined the effect of CEO tenure in influencing bank outcomes, a topic that acquires particular importance in context of public sector banks where the tenure of the CEO is relatively short. Using data that spans over ten years from 2003-2012 that witnessed a large number of governance reforms in India, the results of their empirical analysis suggest that while board size plays an insignificant role in determining bank outcomes, board independence plays a significant role. There is a strong ownership effect with board independence having a significant effect on performance of private sector banks and negatively impacting the performance of private sector banks. The analysis also reveals that longer tenure of the CEO has significant effects in improving bank outcomes both in terms of financial performance and asset quality. These positive effects strengthen in the later years of CEO tenure. Their results have governance implications for strengthening the composition of board of directors and CEO tenure, especially in publicly owned banks.

10. USING ADVANCED STATISTICAL TECHNIQUES IN FINANCE RESEARCH

10.1. Using SEM with secondary data

Kong & Olin (2008), Wong et al (2011) and Thiyagarajan & Arulraj (2012) used SEM on secondary data to analyse different models and reported significant results which were able to validate models / theory relevant in the financial sector research. This goes to provide direction about use of secondary financial data for analysis using SEM.

10.2. Using PLSPM methodology with secondary data

Tobias (1995), Diamantopoulus (2001), Haenlein & Kaplan (2004), Tenenhaus (2005), Vinzi et al (2004, 2010), Mateos (2011), Hensler & Sarsteldt (2012), Monecke & Liesch (2012) have brought out different attributes of the PLS PM analysis technique and highlighted features relating to the suitability of the technique. This technique can be used to construction of indices for measuring various aspects of different phenomena. Sanchez (2013) provided a detailed method of analysis of problems using PLSPM and also provided methods of model assessment. Garson (2014) brought out many advantages of PLS PM Goh et al (2013) advocated for the use of PLSPM in Causal Inference for Archival Financial Accounting Research. Archival data also can be used to measure unobserved variables (constructs) defined by researchers e.g., financial disclosure index and corporate governance related indices which are difficult to be directly observed and can lead to new research directions using both single item and multi item constructs. Beuningen & Schmeets (2013) constructed an index for Netherlands to determine social capital in 2009 with an objective to provide a coherent overview of social capital in the Netherlands, to monitor social capital over time and to compare subpopulations, thus help policy makers identify subgroups that lag behind. Edge & Guerrieri (2014) explored the possibility of using PLS PM in banking sector to generate conditional forecasts of bank Net Interest Margins and other components of bank Pre-Provisioning Net Revenue, particularly, for those banks that participate in the Federal Reserve's annual stress tests. Jajo & Harrison (2014) presented an achievement index using real data examples for combining university ranking outlined in three different systems which can consolidate the results into one composite score as university rankings.

11. METHODOLOGICAL OVERVIEW OF NPA RESEARCH

11.1. Global methodology

There is extensive international evidence which suggests that NPLs may be explained by both macroeconomic and bank specific factors – Khemraj & Pasha (2009). It may be seen that almost all international researchers used at least one macroeconomic variable and a few bank specific or other factors for both causes and effects of NPL. **Tables 2 and 3** list variables used for study of causes and effects of NPL used by international researchers.

11.2. Indian Methodology

It may be seen from the domestic papers considered above that the papers outlining trends and limited analysis of NPAs point to a growing area of study amongst Indian researchers. In case of modeling of NPA – both its causes and its effects, most of the researchers have specifically focussed on bank specific factors while there are few papers which discuss the impact of macroeconomic factors relating to causes and effects of NPA. **Tables 4 and 5** summarise list of variables variables used for estimating causes and effects of NPA by Indian authors.

In view of two broad methodological approaches deployed by international authors and Indian authors, there appears to be a gap in research efforts relating to Indian banks. This calls for exploring modeling relationships between NPA and other relevant variables for their estimation, as also for estimating effects of NPA on other variables.

12. RESEARCH GAPS

This review report examined papers relating to concept and evolution of NPA in banking industry across India and some other parts of the world, including some of its causes and effects. NPAs pose serious challenges for banks and have implications for the entire financial

Table 2
Explanatory Factors Selected for causes of NPL by International Authors

Explanatory factors selected by researchers for causes of NPL	
Macroeconomic factors	*Bank Specific and other factors*
Economy Real GDP growth rate, GDP Per capita, annual inflation rate, REER, change in REER, real interest rate, change in unemployment, level of country financial development, world trade growth, energy crisis, Government policy, natural disasters, Capital Formation to GDP, Industry Value Added, firms' debt/asset ratios, diffusion index of business conditions, integrity of borrowers, non-oil real GDP growth **Monetary Policy & Financial Sector** Federal Funds rate, M2, interbank loans, bank ownership, Foreign ownership of banks, bank market concentration, stock market returns, percentage of state owned banks, the VIX index (proxying for global risk aversion and tight financing conditions), feedback system, share prices, inter connected lending	**Bank Balance Sheets** outstanding deposits, bank size, total loans, annual growth in loans, low capitalisation, Loan loss reserves **Bank Income Statements** non-interest income, interest spread Bank Terms of Credit short-term interest rate, Lending rate, lack of collateral security **Bank Quality** management quality, inadequate market information, inadequate risk management, insider loans, poor credit monitoring, poor credit policy, inefficiency, credit risk issues, cost of borrowing, **Bank Profitability Ratios** Return on Assets, Return on Equity, NIM **Bank Structural Ratios** Bank Capital to Assets, regulatory capital to RWA, solvency ratio, Loan-deposit ratio, equity to total assets, equity to liquid assets, ratio of loans to total assets, bank's liquidity ratio, bank's adjusted capital adequacy ratios, comparative core leverage (i.e. core capital to total assets), comparative core capital to RWA off balance sheet exposure, Capital Adequacy Ratio (Tier 1), Capital Adequacy Ratio (Tier 1 and 2)

Source: Authors analysis of papers / areas of study

Table 3
Explanatory Variables for Effects of NPL by International Authors

Explained factor selected by researchers for effects of NPL		
DV	*Macroeconomic factors*	*Bank Specific and other factors*
Earnings Profitability ROA Total Loans to Total Assets	UK GDP World GDP Exchange rate Asset prices of collaterals	**Bank Balance Sheet** Rapid loan growth, equity, NPLs, Deposit growth **Bank Quality** Higher interest rate, Distribution of loans across industrial sectors, Effectiveness of bank credit monitoring – proxied by cost to income ratio, no. of staff per domestic branch, Support **Bank Ratios** interest margin, overheads / assets, NPL / LA, LLP / CL, LA / TD, NPL / Total Loans

Source: Authors analysis of papers / areas of study

Table 4
Explanatory Factors chosen for Causes of NPL by Indian Authors

Explanatory factors selected by researchers for causes of NPA	
Macroeconomic factors	*Bank Specific factors*
Economy GDP, GDP growth, Growth rate of Real GDP, Business Cycle, Per Capita Income at NNP, IIP, Inflation Rate, Savings Growth Rate, **Monetary Policy & Financial Sector** Policy rate, Regulatory Capital Requirement, Market Capitalisation Growth Rate, Bank Lending Rates,	**Bank Balance Sheets** Advances, credit growth, credit growth rate, bank size, real loan growth, bank assets, Addition to NPA, Gross Advances, Total Deposits, Priority sector Lending, Non Priority Sector Lending, Loans to weaker sections, , **Bank Terms of Credit** Loan maturity, interest rate, collateral value **Bank Quality** Credit orientation, operating expenses, ratio of number of rural and sub urban branches to total bank branches, **Bank Profitability Ratios** Operating efficiency, profit to total assets, interest margin, cost burden on banks, cost of funds, ROA, operating expenses to total assets **Bank Structural Ratios** Liquid assets to total assets, priority sector advances to total advances, CAR, CDR, Loan exposure to priority sector.

Source: Authors analysis of papers / areas of study

Table 5
Explanatory Factors used for Effects of NPL by Indian Authors

Explained factor selected by researchers for effects of NPA		
DV	*Macroeconomic factors*	*Bank Specific factors*
ROA Bank Credit Interest Spread to TA NPM RONW NP to Total Funds NP to Total Assets	GDP Growth Rate, Inflation Rate, CRR	**Bank Balance Sheet** priority sector advances, term deposits, provisions and contingencies, NPA , **Bank Ratios** GNPA Ratio, NNPA Ratio, spread burden, CDR, Operating expenses, business per employee, CRAR

Source: Authors analysis of papers / areas of study

system. However, it appears that the causes of NPA in India have not so far been adequately discussed in the existing literature. Effects of NPA on bank and on other sectors have also apparently not been extensively studied. The literature review finds the following broad research gaps:

- International researchers have used a wide range of explanatory factors / variables for NPL study while Indian researchers have had a somewhat restricted view of such variables. It may be worthwhile to consider hitherto unused variables to analyse the NPA position in India OR to take a new look at the variables already researched by Indian authors in order to derive new insights into the NPA problem.
- Since banks are linked to other sectors, it is important to understand how the occurrence of NPA impacts these sectors. It may be worthwhile to study the relationship between credit (and therefore NPA) and other macroeconomic variables..
- There exist outstanding academic research issues pertaining to information asymmetry, adverse selection and moral hazard as applicable in the lending business. These flow from the field of economics and general understanding but limited research / evidence is available in borrowing / lending behaviour. It would be interesting to research on these to ascertain how to measure and minimise the impact of asymmetric information and other behavioural issues affecting managers.
- Occurrence of NPA may lead to changes in bank behavior. There may thus be a case to study management and governance factors causing NPA.
- While researchers have used different timelines for data, there may be a good case to conduct longer time series based modeling (if required, broken into suitable periods) with relevant variables to see how the relationships may have changed over specific periods of time.
- Using of advanced multivariate statistical techniques may be done for modeling in order to arrive at more meaningful conclusions. These techniques include but are not limited to Canonical Correlation, SEM, Factor Analysis, Panel Data Techniques, Partial Least Squares Path Modeling etc.

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